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104

# FOREST CONTROL

## by CONTINUOUS INVENTORY

"Today I have grown taller from walking  
with the trees."

...Karle Wilson

Milwaukee, Wis. November, 1962 No. 104

"---And ring from all the trees,  
Sweet Freedom's Song---"

When I pounded the northern white cedar tree in the bog it sounded solid, but the young forester from Kimberly-Clark disagreed. We bored the tree and it was rotted in the heart. Even though the crown was good, and the trunk cylindrical and clean, the cedar tree in the bog was a butter churn and I was wrong.

The eye and the ear are fallible and in time of need they sometimes falter and fail. Perhaps we do not properly weigh all of the factors involved. So it may be with my judgment of certain background matters in forestry. I nosed about for three days at the recent meeting of the Society of American Foresters in Atlanta, Georgia, talking, listening, and studying the records. I sounded out a good many foresters and I am sure they did the same to me. In my judgment, in spite of wonderful progress in forest management throughout the country, it seemed to me that certain methods and services provided by foresters are due for reconsideration and change. In our own particular field of forest inventory, after considerable pounding, sounding, and testing, I make these observations.

An undercurrent of thought is pulling us toward a more permanent system of forest inventory on the National level. Recoverable plots for direct correlation and projection between inventories

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were discussed in the hallways and at the social hours. There are many reasons for such discussions.

One reason of increasing importance is the backlog of 10,000 to 20,000 recoverable CFI plots in each of several forest regions. This reservoir of experience in permanent inventory is capable of supplying much guiding influence and considerable data for study and analysis.

"We use CFI for many more purposes than we first imagined," one forester after another tells us. The reasons are pretty obvious. Each plot taken in the past decade is dignified by the most particular research-like methods, and each has the ~~maximum~~ of flexibility in application and use. The plots are bounded samples embracing the whole ecological and biological make-up of the forest. The trees are measured and recorded as associates in the woods plan and not as intermittent members. All of the many interlocking and counter-posing variables of the forest establishment are enmeshed in the data compiled from fixed radius plots.

CFI over the past 10 years has given new emphasis to the sampling of borderline conditions which comprise such a large share of every forest property. The system covers the back country and opens up vistas hitherto viewed only dimly and at a distance by explorative research. Permanent sampling is helping to close the gap between exploration and discovery and the application of results, and what could be more important to industrial research or forest management than this?

It is not surprising to hear of this ground swell of opinion and belief from foresters on new uses for CFI. All of this is part and parcel of the great economy of the method. Related to these discussions is the concern of many on the high cost of losing or dropping forest survey plots. Due in part to numerous modifications of procedure at high administrative levels, these surveys have been expensive. Test runs of new methods should be a function of research, and inventories need not be made and discarded on a county or state level, but on a much smaller scale.

The test tube approach has worked well on industrial inventory techniques and procedures in Region 9. CFI, for 18 years, has kept a running record on an annual basis for 75 fixed radius plots in Stone's Woods. This information, which has amply decided the adequacy of many CFI procedures, will be available on cards in 1963 for further projection and correlation studies. The work in this woods has come to be called the Purdue Forest School Project because the data have been used there for many years of student and professorial study, demonstration and practice.

The establishment of a more permanent and directly comparable system of inventory on a National scale should lead to intensified technician training in tree measurement. Many hidden errors occur in inventory work. It is important that they be reduced to the minimum at the point of first record in the woods.

The ability to do precise work in permanent forest inventory requires thorough training, and it also requires the will to do good work. Neither is possible without the other.

CAL STOTT  
Forester

Lee Winner Reviews Basic Features of CFI for West Coast Indian Lands

CFI or Continuous Forest Inventory is a detailed accounting of stock on hand taken in such manner as to provide for frequent measurement of forest change. It is the precise measurement of trees on systematically located sample plots, the number of which is calculated to be reliably representative of large forest areas. The plots have fixed boundaries, are permanently located, and contain individually identified trees. They are periodically revisited at relatively short intervals (5 years) and are remeasured by means of identical techniques, recomputed using identical tables and formulae, and the data are reanalyzed with an open mind receptive to adopting such management policy changes as may be indicated.

In recent years the name CFI has been applied to a great variety of programs -- some of them good, some of them fundamentally unsound. What CFI is not, is of great concern, for it is not many things. It is not a cumulative tally of tree and site description; it is not a system of temporary plots, it is not a kind of point sampling, and it is not merely growth plots. It is not any method of cruising that discourages return to the exact original sample location, with distinct boundary relocation possibility, and identical tree remeasurement.

If carefully followed in principle and application, CFI is capable of yielding a wide spectrum of reliable results ranging all the way from confirmation of present management programs to indications of the need for completely redesigned management. Machine grouped tree and area data will, through frequent observation, provide a measure of natural and induced forest trends, and permit determination of adjustment techniques to minimize forest loss and maximize forest growth. Analyzed results can become the basis for adjustment of management plans, construction of cutting budgets, establishment of silvicultural work improvement programs, and business and economic correlations. Each reinventory will strengthen data through trend stabilization.

CFI is a program demanding careful work. One of the many advantages offered by CFI lies in the fact that measurement and computing mistakes are usually glaring in their evidence and "hidden" errors can be eliminated both in the data processing and at the time of the first remeasurement. In spite of this, however, CFI is a program that demands careful work. Carelessness at any stage will result only in disillusionment!

With all of its tested techniques this is the least expensive system available for general management control, per unit of information collected. At only slight increase in establishment cost over temporary or "one-shot" systems, a vast realm of management control possibilities becomes quickly available through CFI, and its conveniently and economically recoverable sample plots.

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VOLUMES PER TREE COMPUTED WITH THE NEW CORDWOOD FORMULA  
AND COMPARED WITH OTHER SOURCE DATA

Refer to Newsletter No. 97, April, 1962

DBH	USABLE LENGTH	SPECIES FACTOR	SOUND- NESS FACTOR	CORD VOLUME PER TREE		
				NEW FORMULA FOR 1401	BULLETIN 1104 LSFE STATION	ORIGINAL CFI FORMULA
5.0	8	1.10	.86	.011	.010	.010
5.0	24	1.00	.97	.026	.021	.025
6.0	8	1.00	.97	.016	.016	.014
6.0	32	1.05	.97	.049	.048	.051
8.0	16	1.10	.86	.047	.047	.045
8.0	40	1.10	.86	.096	.100	.099
10.0	16	1.10	.86	.075	.078	.074
10.0	48	1.10	.78	.154	.162	.158
16.0	40	1.10	.65	.301	.300	.294
16.0	48	1.00	.78	.368	.367	.360
18.0	48	1.10	.65	.431	.429	.423
20.0	32	1.10	.78	.492	.506	.517

Tree dimensions and cordwood volume answers in this table may be used for checking answers computed with the new cordwood volume formula. It is necessary only to search out trees of corresponding dimensions in listings of results computed with the new formula and compare them with these pre-computed answers. There should be perfect agreement. These tree dimensions and answers may also be used for test deck preparation. Original CFI formula answers are tabulated for comparison with the new formula results.